

## REMARKS

Applicant respectfully requests reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

### Status of Claims

Claims 3-5,8-15 and 20 are cancelled without prejudice or disclaimer. Claims 1, 2, 6, 7 and 17 -19 are amended. Subject matter of dependant claims is added to the independent claim and the dependencies of dependant claims are amended to account for the cancelled claims. Thus no new matter is added.

Claims 21 and 22 are added. Features of new dependent claims 21 and 22 are disclosed at least on page 7, Table II of the Original Specification. Thus no new matter is added.

### Claim Rejections – 35 USC § 112

Claims 2 and 9 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 2 as amended to recites the laser frequency of the second step is not less than 2 times and not more than 5 times as high as the laser frequency of the first step when the first laser frequency is 20 Hz. Thus it is clear that when the laser frequency in the first step is 20 HZ the laser frequency in the second step is not less than 2 times and not more than 5 times the laser frequency. Therefore claim 2 is compliant with the requirements of 35 U.S.C 112, second paragraph. Applicant respectfully requests that the rejection is withdrawn.

The rejection as to claim 9 is moot, since claim 9 is cancelled without prejudice or disclaimer.

Claim Rejections – 35 USC § 103

Claims 1-20 are rejected under 35 U.S.C. § 103(a) as being unpatentable over JP 04-212,214.

Claims 1 and 2, as amended recites, among other features,

a laser frequency of a second step being higher than the laser frequency of a first step and the laser frequency of the second step being less than 100 times the laser frequency of the first step;

a power of the laser beams is greater than or equal to 400 mJ;

a temperature of the single-crystal substrate during the pulsed-laser deposition is more than or equal to 600 °C and less than 1,200 °C;

a gas pressure during the pulsed laser deposition is within the range of 1.33 Pa to 100 Pa; and

an atmospheric gas during the pulsed laser deposition contains oxygen.

Frequency vs. Deposition rate

Claim 1, recites, the laser frequency of the second step being higher than the first step and less than 100 times the laser frequency of the first step. JP 04-212,214 fails to teach suggest or render predictable, having a higher laser frequency in the second step than the first step and the higher frequency being less than 100 times the laser frequency of the first step.

Instead, JP 04-212,214 discloses a laser deposition method in which the deposition rate is set low during the initial stage and increased afterward. JP 04-212,214 discloses varying the deposition rates instead of the laser frequency. Therefore claim 1 is believed to be allowable.

Unexpected Results

Features of claims 1 and 2 create unexpected results. As shown is Table II providing a laser power above 400 mJ leads to higher critical current densities such as between the

range of  $1.5 \text{ MA/cm}^2 - 4.0 \text{ MA/cm}^2$ . JP 04-212,214 discloses a critical current density of only  $0.41 \text{ MA/cm}^2$ . Thus the claimed feature of providing laser power above 400 mJ leads to unexpected results in the technical field where an increase in the critical current density up to 10 times has a great significance to a person skilled in the art.

Regarding a substrate temperature of greater than or equal to  $600^\circ\text{C}$  to up to  $1200^\circ\text{C}$ , as shown in Table III providing a substrate temperature of greater than or equal to  $600^\circ\text{C}$  to up to  $1200^\circ\text{C}$  leads to higher critical current densities such as between the range of  $1.8 \text{ MA/cm}^2 - 4.0 \text{ MA/cm}^2$ . JP 04-212,214 discloses a critical current density of only  $0.41 \text{ MA/cm}^2$ . Thus the claimed feature of providing a substrate temperature of greater than or equal to  $600^\circ\text{C}$  to up to  $1200^\circ\text{C}$  leads to unexpected results in the technical field where an increase in the critical current density up to 10 times has a great significance to a person skilled in the art.

Regarding gas pressure within the range of 1.33 Pa to 100 Pa, as shown in Table IV providing gas pressure within the range of 1.33 Pa to 100 Pa results in a higher critical current densities such as between the range of  $1.1 \text{ MA/cm}^2 - 4.0 \text{ MA/cm}^2$ . Thus the claimed feature of providing gas pressure within the range of 1.33 Pa to 100 Pa leads to unexpected results in the technical field where an increase in the critical current density up to 10 times has a great significance to a person skilled in the art.

Similarly, regarding claims 6 and 7, as shown in Table IV providing gas pressure within the range of 1.33 Pa to 66.66 Pa results in a higher critical current densities such as between the range of  $1.2 \text{ MA/cm}^2 - 4.0 \text{ MA/cm}^2$ . Thus the claimed feature of providing gas pressure within the range of 1.33 Pa to 66.66 Pa leads to unexpected results in the technical field where an increase in the critical current density up to 10 times has a great significance to a person skilled in the art.

Also shown in each of the above mentioned tables is the fact that values outside the above ranges lead to a reduced critical current density, thus the above parameters and related ranges are of a critical nature. Therefore due to the critical nature of each of the numerous parameters discussed in the original specification and the unexpected results achieved due to

the claimed values of these parameters, the claimed invention could not be obvious to one of ordinary skill in the art.

Response to Examiner's Argument

The Examiner states that "the examples need to show all other parameters constant and changing the claimed parameter to properly ascertain that the advantages are directly related to the claimed parameters as argued. (Final Office Action of August 14, 2008; page 4, line 12 to page 5 line 2). In response to the above comments, the power of the laser beam based on Table 2, the temperature of the single-crystal substrate during the pulsed-laser deposition based on Table 3, gas pressure based on Table 4 and type of gas based on Table 5 in the specification are included in claims 1 and 2. Thus the claims are commensurate in scope with the examples per Examiner's request.

Therefore claims 1 and 2 are believed to be allowable. Because claims 2, 5-7 and 16-22 depend directly or indirectly from claims 1 and 2 they are believed to be allowable for at least the same reasons claims 1 and 2 are believed to be allowable.

New Claims 21 and 22

New claims 21 and 22 recite, among other features, the power of the laser beam is greater than or equal to 500 mJ. Claims 21 and 22 depend from claims 1 and 2, respectively, thus claims 21 and 22 are believed to be allowable for at least the same reasons claims 1 and 2 are believed to be allowable. Moreover, the cited references fail to teach, suggest or render predictable the power of the laser beam is greater than or equal to 500 mJ. Therefore claims 21 and 22 are believed to be allowable.

Concluding Remarks

After amending the claims as set forth above, claims 1, 2, 6-7, 16-19, and 21-22 are pending in this application.

Applicant believes that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by the credit card payment instructions in EFS-Web being incorrect or absent, resulting in a rejected or incorrect credit card transaction, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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